

Claims

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1. Method for transferring a pattern from an elastic stamp to a
5 substrate in the presence of a third medium, the method
comprising: controlling a layer of the third medium between the
stamp and the substrate to a predetermined thickness.
2. Method according to claim 1, wherein the substrate is rigid.
- 10 3. Method according to claim 1, wherein the substrate is
impermeable.
4. Method according to claim 1, wherein the third medium
15 comprises one or more of gas, water, solvent, polymer, emulsion,
sol-gel precursor, and the like.
5. Method according to claim 1, wherein the controlling
comprises avoiding trapping of the third medium via the stamp
20 matrix being permeable to the third medium.
6. Method according to claim 1, wherein the controlling
comprises forming a nanometer sized gap in the stamp filled with
the third medium.
- 25 7. Method according to claim 1, wherein the controlling
comprises providing a patterned stamp surface having channels to
drain the third medium.
- 30 8. Method according to claim 1, wherein the controlling
comprises filling vias and recesses formed in the stamp with a
component having an affinity for the third medium.

9. Method according to claim 8, wherein the component is hydrophilic.

10. Method according to claim 9, wherein the component comprises
5 a gel.

11. Method according to claim 10, wherein the gel is swellable by the third medium.

10 12. Method according to claim 11, wherein the controlling comprises swelling the gel with the third medium to form protrusions in the stamp.

13. Method according to claim 1, wherein the controlling
15 comprises providing an array of protrusions and recessed zones in the stamp.

14. Method according to claim 13, wherein the controlling comprises guiding excess third medium away from the surface of
20 the stamp via the recessed zones.

15. Method according to claim 13, wherein the array comprises a micrometer-sized pattern subdivided into smaller structures.

25 16. Method according to claim 15, wherein the smaller structures are separated by smaller drainage channels.

17. Method according to claim 16, wherein the smaller drainage channels are connected to a network of larger drainage channels.

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18. Method according to claim 1, wherein the third medium is trapped in a shallow lense-like pocket between the stamp and the surface of the substrate.

19. Method according to claim 1, wherein the controlling comprises trapping the third medium in a pocket between the stamp and the substrate.

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20. Method according to claim 1, wherein the stamp comprises channels.

21. Method according to claim 20, wherein the channels define
10 molecular sized gaps between the stamp and the substrate.

22. Use of the method according to any preceding claim for printing biological molecules on a surface.

15 23. Use of the method according to any of claims 1 to 21 for printing dyes on a surface.

24. Use of the method according to any of claims 1 to 21 for printing catalysts on a surface.

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25. Use of the method according to any of claims 1 to 21 for printing acids or bases on a surface.

26. Use of the method according to any of claims 1 to 21 for
25 printing of radical initiators on a surface.

27. Use of the method according to any of claims 1 to 21 for detection of molecules through proximity by fluorescence resonance transfer.

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28. Use of the method according to any of claims 1 to 21 for purification and concentration of reactants.

29. Use of the method according to any of claims 1 to 21 in an offset printing process.

30. Use of the method according to any of claims 1 to 21 in a
5 rolling contact process.

31. A stamp for transferring a pattern to a substrate in the presence of a third medium, the stamp comprising a contact surface and drainage channels formed in the contact surface.

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32. A stamp according to claim 31 wherein the surface is patterned.

33. A stamp of claim 31, wherein the stamp comprises an array of
15 protrusions.

34. A stamp according to claim 32 wherein the patterning comprises a micrometer sized pattern subdivided into smaller structures.

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35. A stamp according to claim 34, wherein the drainage channels extend between the smaller structures.

36. A stamp according to claim 31, wherein the drainage channels
25 form a network.

37. A stamp for transferring a pattern to a substrate in the presence of a third medium, the stamp comprising a permeable hydrophilic matrix.

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38. A stamp according to claim 37, wherein the stamp comprises active vias.

39. A stamp according to claim 38, wherein the vias are filled with a material permeable by a third medium

40. A stamp according to claim 37, wherein the stamp comprises 5 active recesses.

41. A stamp according to claim 40, wherein the recesses are filled with a material permeable by a third medium.